

WHAT WE CLAIM IS:

- 1 1. A method of sampling internet protocol traffic over links of an internet
2 protocol network comprising the steps of
3 sampling packets at network traffic points as a function of an internet
4 protocol packet content, and
5 generating a packet label for each sampled packet.
- 1 2. A method as recited in claim 1 wherein said function of an internet
2 protocol packet content is dependent upon substantially invariant data of said
3 packet.
- 1 3. A method as recited in claim 2 wherein said invariant data of said packet
2 includes at least high entropy data fields.
- 1 4. A method as recited in claim 2 wherein said invariant data excludes at
2 least variable fields.
- 1 5. A method as recited in claim 3 wherein said invariant data further excludes
2 at least one of a service type field, a header checksum, a version field, and a
3 header length field.
- 1 6. A method as recited in claim 2 wherein said invariant data further includes
2 a low entropy data field.
- 1 7. A method as recited in claim 1 wherein said packet label has a length
2 determined to be as small as possible consistent with avoiding a collision with a
3 similarly labeled packet during the expected period a sampled packet takes to
4 traverse the network.
- 1 8. A method as recited in claim 1 wherein said applied packet label
2 comprises between 16 and 24 bits.

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1 9. A method as recited in claim 1 wherein a sampling interval for a given
2 period is determined by the upper bound of a sampled packet's expected lifetime.

1 10. A method as recited in claim 1 further comprising the step of transmitting
2 said generated label to a measurement system.

1 11. A method as recited in claim 10 further comprising the step of multiplying
2 the number of packet samples and the number of bits per sampled packet at a
3 measurement system.

1 12. Circuit apparatus for sampling internet protocol traffic over links of an
2 internet protocol network for use in sampling traffic at network traffic points
3 comprising
4 a processor for computing a sampling function, responsive to the sampling
5 function, for determining packets to be sampled, and for generating a label for
6 each sampled packet.

1 13. Apparatus as recited in claim 12 further comprising a packet buffer for
2 temporarily holding packets during sampling.

1 14. Apparatus as recited in claim 12 providing an output to a measurement
2 system of labels for only sampled packets.

1 15. Apparatus as recited in ~~claim 12~~ wherein said sampling function of an
2 internet protocol packet content is dependent upon substantially invariant data of
3 said packet.

1 16. Apparatus as recited in claim 15 wherein said invariant data of said packet
2 includes an invariant data field.

1 17. Apparatus as recited in claim 15 wherein said invariant data excludes a
2 variable data field.

1 18. Apparatus as recited in claim 15 wherein said invariant data further
2 excludes at least one of a service type field, a header checksum, a version field,
3 and a header length field.

1 19. Apparatus as recited in claim 15 wherein said invariant data further
2 includes a low entropy data field

1 20. Apparatus as recited in claim 12 wherein said packet label has a length
2 determined to be as small as possible to avoid collisions with packets having a
3 similar label within the expected period a sampled packet takes to traverse the
4 network.

1 21. Apparatus as recited in claim 12 wherein said applied packet label
2 comprises between 16 and 24 bits.

1 22. Apparatus as recited in claim 12, said processor for determining a
2 sampling interval by the upper bound of a sampled packet's expected lifetime.

1 23. Apparatus as recited in claim 12 further comprising a data transmitter for
2 transmitting a plurality of labels and data to a measurement system as an IP
3 packet.

1 24. Apparatus as recited in claim 12 said processor for multiplying the number
2 of packet samples and the number of bits per sampled packet.

1 25. Apparatus for sampling switched packet traffic over links of a packet
2 switching network for use in sampling traffic at network traffic points comprising
3 an input buffer for temporarily storing incoming data packets during
4 sampling and

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1 33. A method as recited in claim 32 wherein said altered bit comprises a bit of
2 a protocol version field.

- 1 ~~34.~~ A method of generating a label for a packet comprising the step of
2 determining a hashing function to generate a practically unique label for a packet
3 selected for sampling so that said selected packet for sampling will not collide
4 with another similarly labeled packet at an expected packet rate within an
5 expected period of life of said packet selected for sampling.

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